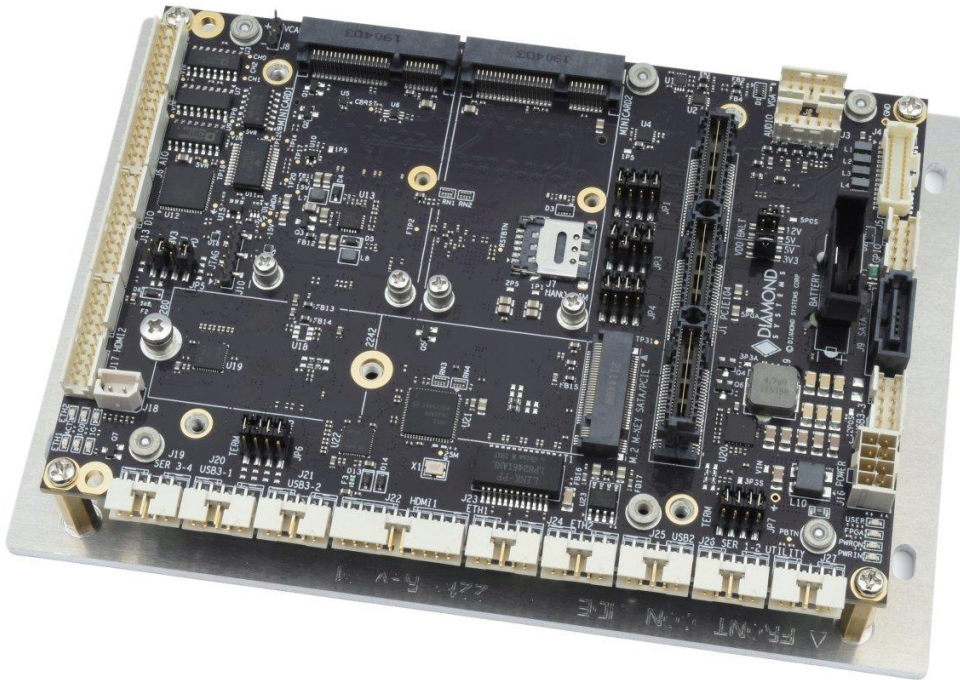




# JASPER

## COM Express Type 6 Carrier Board and SBC

### User Manual



Revision No	Release Date	Comments
1.1	02/08/2023	Initial release
1.2	05/03/2023	General text and image updates

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# 1 IMPORTANT SAFE HANDLING INFORMATION



## WARNING!

### ESD-Sensitive Electronic Equipment

Observe ESD-safe handling procedures when working with this product.

Always use this product in a properly grounded work area and wear appropriate ESD-preventive clothing and/or accessories.

Always store this product in ESD-protective packaging when not in use.

### *Safe Handling Precautions*

Diamond Systems boards are designed with complex circuitry and electronic components that are ESD-sensitive. This increases the likelihood of the boards incurring accidental damage during handling, installation, and connection to other equipment.

It is highly recommended that the following precautionary measures and best practices be observed in sequential order:

- Wear an anti-static Wristband/Strap or/and an antistatic Lab Coat or/and Rubber-soled shoes.
- Spread anti-static mats over the table or work surface or/and anti-static mats on the floor.
- Unpack components and remove them from their anti-static bags only when they are ready to be used.
- Avoid ungrounded surfaces such as plastic, carpets, floors, or tables, in the work area.
- Handle boards by the edges and their metal mounting brackets. Avoid touching components on the boards and the edge connectors that connect to expansion slots.

The following information describes common causes of failure found on boards and components returned to Diamond Systems for repair. It is provided as a guideline to avoid accidental damage.

**ESD Damage:** This type of damage is typically impossible to detect because there is no visual sign of failure or damage. In this type of damage, the board eventually stops functioning because of some defective components. Usually, the failure can be identified, and the chip can be replaced.

To prevent ESD damage, always follow proper ESD-prevention practices when handling computer boards.

**Damage During Handling or Storage:** Physical damage on boards also occur due to mishandling. A common observation is that of a screwdriver slipping on the board during installation, causing a gouge on the PCB surface, cutting signal traces or damaging components.

Another common observation is damaged board corners, indicating the board was dropped. This may or may not cause damage to the circuitry, depending on components located near the edges. Most Diamond System boards are designed with a minimum 25 mils clearance between the board edge and component pad. The ground/power planes are located a minimum of 20 mils from the edge to avoid possible shorting from this type of damage. However, these design rules do not prevent damage in all situations.

Sometimes boards are stored in racks with slots that grip the edge of the board. This is a common practice for board manufacturers. Though Diamond Systems boards are resilient to damages, the components located close to the board edges can be damaged or even knocked off the board if the board lies tilted in the rack.

Diamond Systems recommends that all its boards be stored only in individual ESD-safe packaging units. If multiple boards are stored together, they should be contained in bins with dividers placed between the boards. Do not pile boards on top of each other or cram too many boards within a small location. This can cause damage to connector pins or fragile components.

**Bent Connector Pins:** This type of problem can be resolved by re-bending the pins to their original shape using needle-nose pliers.

The most common cause of a bent connector pin is when the board is pulled off a stack by tugging it at angles from one end of the connector to the other, in an effort to release it off the stack. Tugging the board off the stack in this manner can bend the pin(s) significantly.

A similar situation can occur when pulling a ribbon cable off a pin header. If the pins are bent too severely, bending them back can cause them to weaken or break. In this case, the connector must be replaced.

**Power Damages:** There are various causes of power-specific damages that can occur while handling the board. Some common causes such as –a metal screwdriver tip slipping, or a screw dropping onto the board while it is powered-up, causes a short between a power pin and a signal pin on a component.

These faults can cause over-voltage/power supply problems besides other causes described below.

To avoid such damages, assembly operations must be performed when the system is powered off.

**Power Supply Wired Backwards:** Diamond Systems power supplies and boards are not designed to withstand a reverse power supply connection. This will destroy almost all ICs connected to the power supply. In this case, the board will likely be irreparable and must be replaced. A chip destroyed by reverse or excessive power will often have a visible hole or show some deformation on the surface due to vaporization inside the package.

**Overvoltage on Analog Input:** If a voltage applied to an analog input exceeds the power specification of the board, the input multiplexer and/or parts behind it can be damaged. Most Diamond Systems boards will withstand an erroneous connection of up to 36V on the analog inputs, even when the board is powered off, but not on all boards, and not under all conditions.

**Overvoltage on Analog Output:** If an Analog output is accidentally connected to another output signal or a power supply voltage, the output can be damaged. On most Diamond boards, a short circuit to ground on an analog output will deter any damage to the board.

**Overvoltage on Digital I/O Line:** If a Digital I/O signal is connected to a voltage above the maximum specified voltage, the digital circuitry can be damaged. The acceptable voltage range, on most Diamond Systems boards connected to digital I/O signals is 0-5V, with overvoltage protection up to 5.5V (-0.5 to 5.5V). Overvoltage beyond this limit can damage the circuitry.

Other considerations are Logic Signals, which are typically generated between 12V to 24V.

If a Digital I/O Line of 12V to 24V is connected to a 5V logic chip, the chip will be damaged, and the damage could extend to other chips in the circuit.

**IMPORTANT!** Always check twice before Powering Up!

## 2 INTRODUCTION

### 2.1 Jasper Product Overview

This Product is a COM Express Compact/Basic type 6 carrier board with PCIe104. The carrier is designed to support a variety of COM Express modules to provide both rapid product line expansion with a variety of processors and long life by enabling simple replacement of the COM when the designed-in one becomes obsolete.

The COM Express module mounts on the bottom side of the board, and the PCIe104 expansion sockets are on the top side. The board dimensions are 4.000" x 5.750", matching the 3.5 inch form factor in size and mounting hole pattern. The larger size is necessitated due to the incompatibility between the mounting hole patterns of the two form factors plus the desire to provide increased PCB coastline for I/O connectors.

A thicker PCB (.090" / 2.3mm), latching I/O connectors, and full -40/+85C operating temperature provide increased ruggedness, enabling the board to work reliably in mobile and harsh environment applications.

A special feature of Jasper is that most I/O connectors are located along the front edge. This makes it possible to design and build I/O boards that mate directly to Jasper without the use of cables, to reduce size and increase ruggedness for rugged systems applications.



## Feature Description and Connector Type

<b>Feature</b>	<b>Description</b>	<b>Connector Type</b>
Power	18V-36V wide input or 12V fixed supply	Signal Terminated to 8 Position Vertical Connector Header (J16)
RTC	3V power input for RTC functionality	Signal Terminated to 2 Position Vertical Connector Header (J18)
Ethernet	ETH-1 10/100/1000Mbps from COM module	Signal Terminated to 10 Position RA Connector Header (J23)
	ETH-2 10/100/1000Mbps via I210 Ethernet controller	Signal Terminated to 10 Position RA Connector Header (J24)
Mass Storage	2 PCIe minicard socket with USB and SATA Minicard2 supports Nano SIM interface	2 PCIe MiniCard 52 Position (J11 & J12)
	1 M.2 2242 / 2280 SATA/x1 PCIe	M.2 Socket (J15)
	1 Standard 7pin SATA connector	SATA Connector (J9)
Audio	HDA to Analog Audio converter	Signal Terminated to 10 Position Vertical Connector Header (J3)
USB	2x USB 2.0	Signal Terminated to 10 Position RA Connector Header (J25)
	3x USB3.0 / USB2.0	Signal Terminated to 10 Position Connector Header (J20, J21, J14)
Serial Ports	4 ports Software configurable RS-232/422/485 through SP336 transceivers or 2 RS232 only	Signal Terminated to 10 Position RA Connector Header (J19, J26)
Display	2x HDMI	Signal Terminated to 20 Position Connector Header (J17, J22)
	1x VGA (Based on the COMe module)	Signal Terminated to 10 Position RA Connector Header (J2)
	1x Dual Channel 24-bit LVDS port with 3.3V / 5V power option	Signal Terminated to 30 Position RA Connector Header (J4)
LCD Backlight	LCD backlight power and control signals with 5V / 12V power option	Surface Mount 6 Position Connector Receptacle (J29)
Analog/Digital IO	16 Single ended/ 8 Differential ended Ain 4 Aout	Analog Signal Terminated to 30 Position Vertical Connector Header (J6)
	22 Programmable direction digital I/O, 3.3V/5V logic compatible	DIO Signal Terminated to 20 Position Vertical Connector Header (J13)
PCIe104	4 PCIe x1 ports, 1x PCIe x16	Signal Terminated to 156 Position Vertical Connector Header (J1)
Others	4 GPI, 4 GPO, I2C, Reset Button, Power Button	.....

### **Operating System Support**

Windows 10; Ubuntu; Linux

### **Mechanical, Electrical and Environmental Properties**

Form-Factor	4.000" x 5.750"
Cooling Mechanism	Conduction cooling with bottom side heat spreader (target heat spreader height 13mm as per COM express specification)
Power Input Range	18V-36V wide range input or Fixed 12V +/-10% supply
Operating Temperature Range	-40°C to +85°C ambient (final system capability depends on the COM installed)



## 2.2 Baseboard Variants

Feature	Baseline JSP-BB01D	Full-Feature JSP-BB02D	Full Feature w/ DAQ JSP-BB03A
Gigabit Ethernet	1	2	2
Minicard socket	2	2	2
M.2 socket	1	1	1
SATA connector	1	1	1
HDMI	2	2	2
VGA*	1	1	1
LVDS	1	1	1
USB 3.0	3	3	3
USB 2.0	2	2	2
Serial	2x RS-232	4x RS-232/422/485 (Jumper for protocol selection)	4x RS-232/422/485 (SW control for protocol selection)
PCIe104	No	Yes	Yes
Audio	No	1	1
Analog/Digital IO	No	No	16 SI/8 DE Ain 4 Aout 22 DIO
Others	4 GPI, 4 GPO I2C Reset & Power Button	4 GPI, 4 GPO I2C, 1x RS232 Reset & Power Button	4 GPI, 4 GPO I2C, 1x RS232 Reset & Power Button

## 2.3 Jasper Ordering Guide

The table below lists the available standard configurations for the carrier board. As the board can work with multiple COMs, new COMs are tested and added regularly, so check the Diamond website for currently available SBC processor options. In general when a new COM is added, OS support will also be available for the current versions of Windows and Ubuntu Linux.

JSP-BB01D	Jasper COM Carrier, low cost model, 18-36VDC In
JSP-BB02D	Jasper COM Carrier, PCIe/104 expansion, Digital I/O, 18-36VDC In
JSP-BB03A	Jasper COM Carrier, PCIe/104 and Data Acquisition, 18-36VDC In
6882210	Mounting Plate for Jasper Carrier (included with the carrier board)



## 2.4 Product Photos

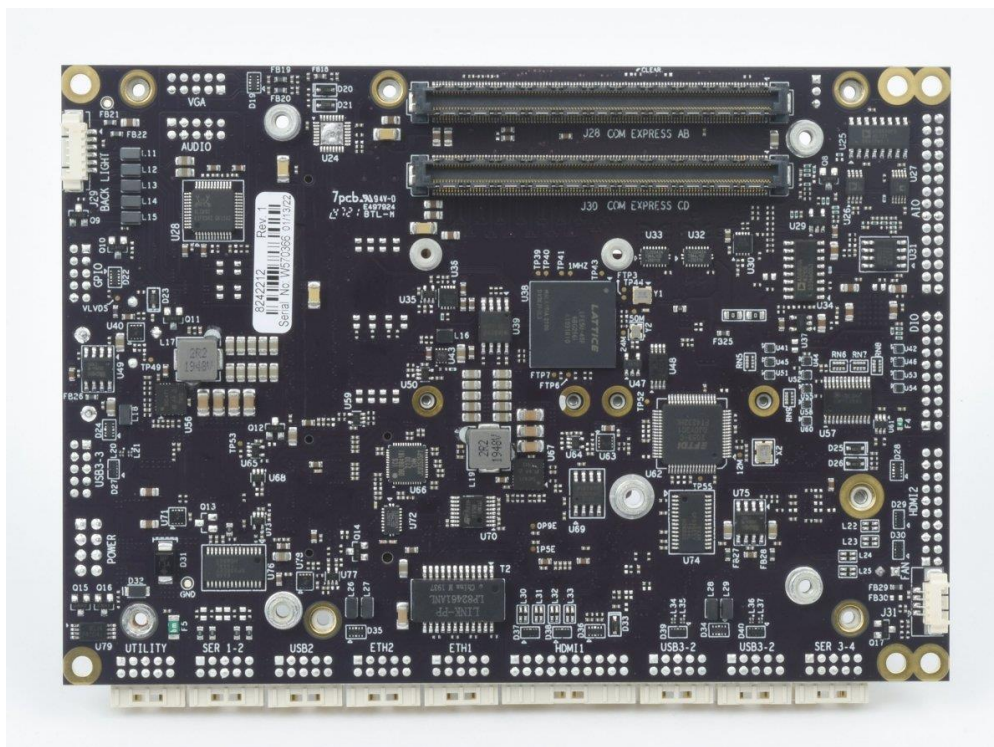


Figure 2-1: COM module installation side (Bottom)

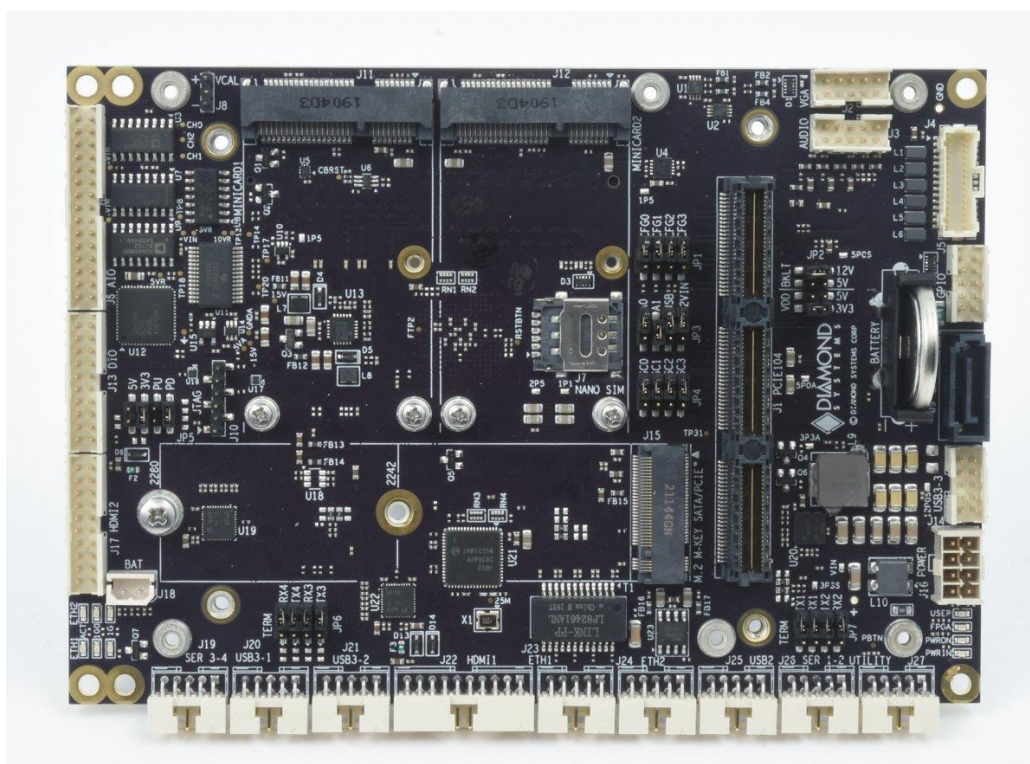
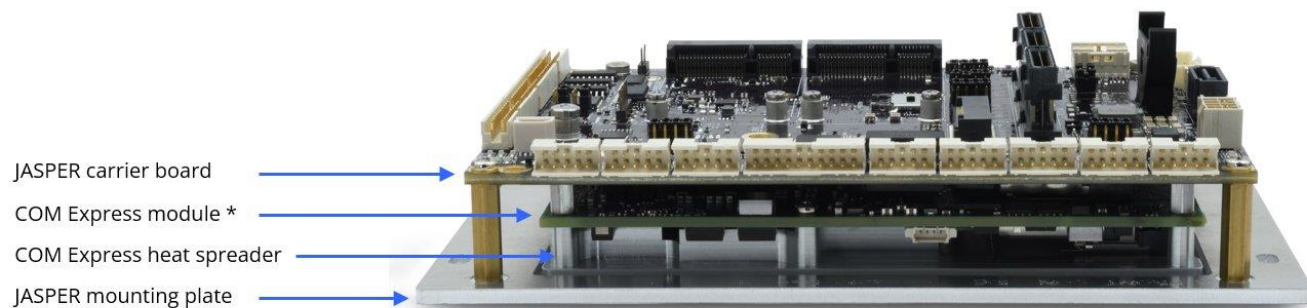
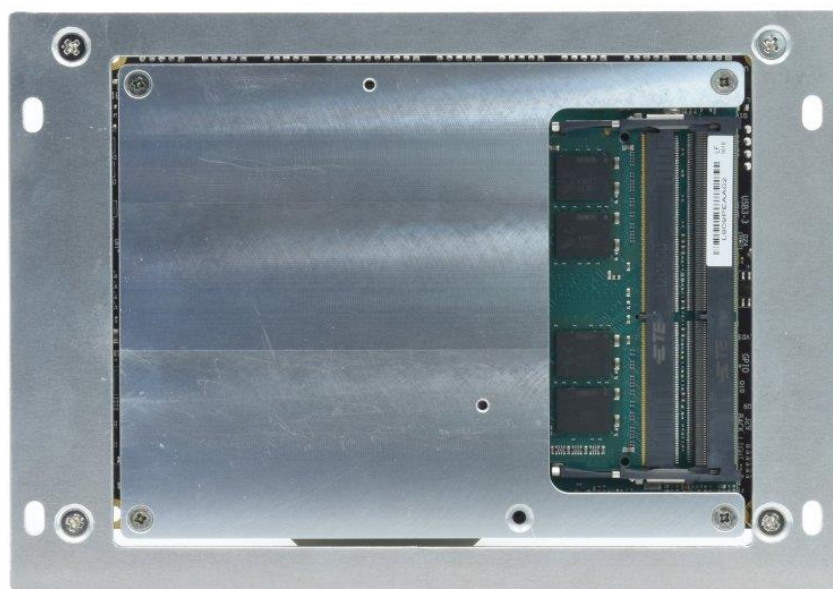


Figure 2-2: I/O expansion side



\* The COM Express module may be either a Basic size 95x125mm or a Compact size 95x95mm, depending on the model of Jasper.

**Figure 2-3: Side view showing COM Express module and heat spreader**



**Figure 2-4: Bottom view showing Basic size COM heat spreader nested in mounting plate**

## 3 FUNCTIONAL OVERVIEW

The following section provides functional details of the key sub-systems implemented on the baseboard.

### 3.1 COM Express Carrier System

Jasper supports COM Express Compact (95x95mm) and Basic (95x125mm) Type 6 modules. The availability of features is dependent on both the COM and the baseboard model. Design emphasis is placed on minimizing the need for BIOS customization to enable the module to work with as many different COMs as possible without any BIOS customization effort.

### 3.2 Power Supply Specifications

The board is powered from a user selectable wide input voltage range of 18V-36V wide range input or Fixed 12V +/-10% supply. Selection is made using a jumper setting available on JP3.

All required supply voltages for the board are derived from the 18V-36V wide range input or fixed 12VDC input. The power supply circuit is intended to support the installation of I/O modules and devices on all connectors and sockets without overloading. The table below lists the current available in Amps for each voltage for each device.

12V	5V	3.3V	Feature
3.6	0.5		COM Express Module
		1.5	M.2
	1		USB2.0Ports
		2.6	PCIe minicard socket
	2.7		USB 3.0 Ports
1	2	1.5	PCIe104
	0.1	0.1	Utility Connector
1.1	1	1	LVDS/LCD

### 3.3 Ethernet Ports

Jasper provides two 10/100/1000 Ethernet ports. One port comes directly from the COM module. The other port is derived from an Intel WGI210IT PCIe Ethernet controller on the carrier board. This controller is accessed via x1 PCIe lane from the COM. Each port includes on-board magnetics. Both Ethernet ports are available at two 2x5 pin latching headers.

On-board LEDs are provided for Link, Activity, and Speed on each port. The LEDs are located in the lower left corner of the board.

### 3.4 PCIe Link Routing

Jasper x1 PCIe port mapping is provided below. The carrier board routes the PCIe x16 lanes from the COM Express CD connector to the PCIe104 connector banks 2 and 3.

Lane 0 – Minicard Socket1  
 Lane 1 – Minicard Socket2  
 Lane 2 – PCIe104 Type1  
 Lane 3 – Intel I210 Ethernet Controller  
 Lane 4 – PCIe104 Type1  
 Lane 5 – PCIe104 Type1  
 Lane 6 – PCIe104 Type1  
 Lane 7 – Option given to M.2 2280/2242  
 PEG x16 – PCIe104 Type1

### 3.5 SATA M.2 Socket



The carrier board offers up to four SATA ports, derived from the COM express module. The first port is connected to an industry-standard vertical 7pin SATA connector that accepts cables with latching connectors.

The M.2 2242/2280 socket supports second SATA / PCIe using a high speed mux. SBC provides onboard M3 4mm spacer to mount M.2 2280 sata SSD and M3 2mm spacer acts as nut for the Male to Female 4mm spacer provided as an accessory to mount M.2 2242 sata SSD.

The third and fourth SATA ports are made available on the first and second minicard sockets respectively using high speed mux. PCIe/SATA interface is supported depending on the type of minicard module inserted.

### 3.6 USB

Jasper supports 2 USB2.0 ports and 3 USB 3.0/USB 2.0 ports from the COM. 2 x USB2.0 ports are routed to one 2x5 headers and 3x USB 3.0 ports are routed to three nos of 2x5 headers.

USB2.0 port 6 is muxed between minicard socket 1 and PCIe104 and can be selected using jumper configuration at JP3.

USB port mapping is shown below:

USB3.0 Ports	
Port Number	Port Termination
Port 0	USB3.0 Header 1
Port 1	USB3.0 Header 2
Port 2	USB3.0 Header 3
Port 3	Not Used
USB2.0 Ports	
Port Number	Port Termination
Port 0	USB3.0 Header 1
Port 1	USB3.0 Header 2
Port 2	USB2.0 Header
Port 3	
Port 4	USB to UART
Port 5	Minicard Socket2
Port 6	Minicard Socket1 / PCIe104
Port 7	USB3.0 Header 3

### 3.7 Audio

The HD audio from the COM module is converted to analog audio using Audio Codec. Line IN, Line OUT and Mic signals are terminated on a 2x5 pin latching header.

### 3.8 LVDS LCD

The carrier board supports a 24-bit dual channel LVDS display with a 2x15 vertical latching connector. A separate backlight supply connector provides LCD backlight supply and PWM control. Backlight supply will be derived from the main power input.

### 3.9 HDMI

The board offers two HDMI 2.0 video outputs. HDMI ports are made available on two 2x10 2mm pitch latching pin headers. SN65DP159RSBT IC is used for DP++ to HDMI level translation.

### 3.10 Serial Ports

The board supports 4 serial ports using a USB to Quad UART controller (FT4232HL) in Full-feature variant and 2 RS232 ports on Low-cost variants. The four serial ports are available on two 2x5 latching pin headers. The ports

use SP336 transceivers (1 transceiver for 2 ports) to support RS-232, RS-422, and RS-485 protocols. The protocol is selected using GPIO pins on the FPGA in full feature and Jumper options are given for protocol selection in Full feature with DAQ. On board jumpers are provided to enable 121-ohm line termination for RS-422 and RS-485 protocols.

In the low-cost version two RS232 (only) ports are made available at one of the 2x5 pin headers.

### 3.11 Data Acquisition

The board provides an optional data acquisition subcircuit containing precision analog input, precision analog output, and digital I/O features. This circuit is controlled by an FPGA attached to the processor via the LPC bus. A pin header on the board provides access to JTAG signals for reprogramming the FPGA on the board and in the field.

Features of the DAQ subcircuit include:

- 16 single-ended / 8 differential analog inputs with 16-bit resolution, programmable input ranges, and 250KSPS maximum throughput
- analog outputs with 16-bit resolution and programmable output ranges
- 22 digital I/O lines with selectable 3.3V/5V logic levels, selectable pull-up/down resistors, programmable direction, buffered I/O, and capability for use as counter/timer and PWM circuits.

The circuit occupies a contiguous area on both sides of the PCB so that this area can be replaced with a customer-specific circuit to provide an economical “semi-custom” SBC.

### 3.12 Backup Battery

An onboard CR2032 coin battery holder is provided for RTC backup.

A 1x2 connector is provided to enable the use of an external battery for rugged applications.

The board can boot and function properly without a backup battery installed.

### 3.13 Trusted Platform Module (TPM)

The board contains Infineon’s SLB 9670XQ2.0 TPM module featuring a fully TCG TPM 1.2/2.0 standard compliant module with an SPI interface. TPM can be used as a root of trust for platform integrity, remote attestation and cryptographic services. This feature will be supported based on the customer requirement and not implemented by default.

### 3.14 Utility

The board offers a 2x5 utility connector, with a Serial Port (RS232), Power Button, Reset button and I2C interface. It provides 500mA fused 3.3V supply.

### 3.15 GPIO Header

The board contains a GPIO header with 4 GPI and 4 GPO available from the COM Express module. GPI3 is muxed with TPM IRQ when the TPM feature is installed.. This connector provides 500mA fused 3.3V supply.

### 3.16 PCIe Minicard Socket

The board offers two full size (51mm length) and half size Minicard sockets. The Minicard interface supports PCIe x1 lane port and SATA port using a mux. Both minicards support USB2.0 interface as well. One socket shares its USB port with the PCIe104 connector; the USB assignment is made using a jumper configuration available at JP3.

A Nano-SIM socket is provided on minicard connector 2. The board provides M2 4mm standoffs on each minicard socket to mount full-size minicards. For half-size minicards the board contains mounting locations with threaded inserts and a hardware kit to attach one standoff and screw for each minicard.

### 3.17 PCIe104 Expansion

The board contains a PCIe104 Type 1 full-size expansion socket with 22mm stacking height.

Design supports up to four, x1 lane PCIe ports on one bank PCIe104 connector and x16 PEG port on the 2<sup>nd</sup> and 3<sup>rd</sup> bank. The PCIe ports availability depends on the COM express module used.

One of the USB2.0 is muxed with minicard and PCIe104 and can be selected using jumper configuration at JP3.

### 3.18 LED Indicators

Jasper provides the following LED indicators. All LEDs are located near a board edge or their respective features. All LEDs are labeled in silkscreen with their function.

Function	LED color and operation	PCB label
Power input	Input power applied	PWR IN
Power Good	Green LED for Power Good indication	PWR ON
Done LED	FPGA is configured successfully	DONE
User LED	Blue, controlled by processor FPGA	USER
Ethernet:	Green LED for Link, activity, and speed for each port	LINK, ACT, SPEED

The board offers one HDMI/DP video output option. The HDMI/DP port is directly from the Module and made available on the I/O connector board connector. All the common choke and ESD protection circuitry are provided on the baseboard. I2C level shifting, and load switch need to be on the IO board.

## 4 BLOCK DIAGRAM

The following Block Diagram illustrates the key functional block of the JASPER COM Express Carrier board.

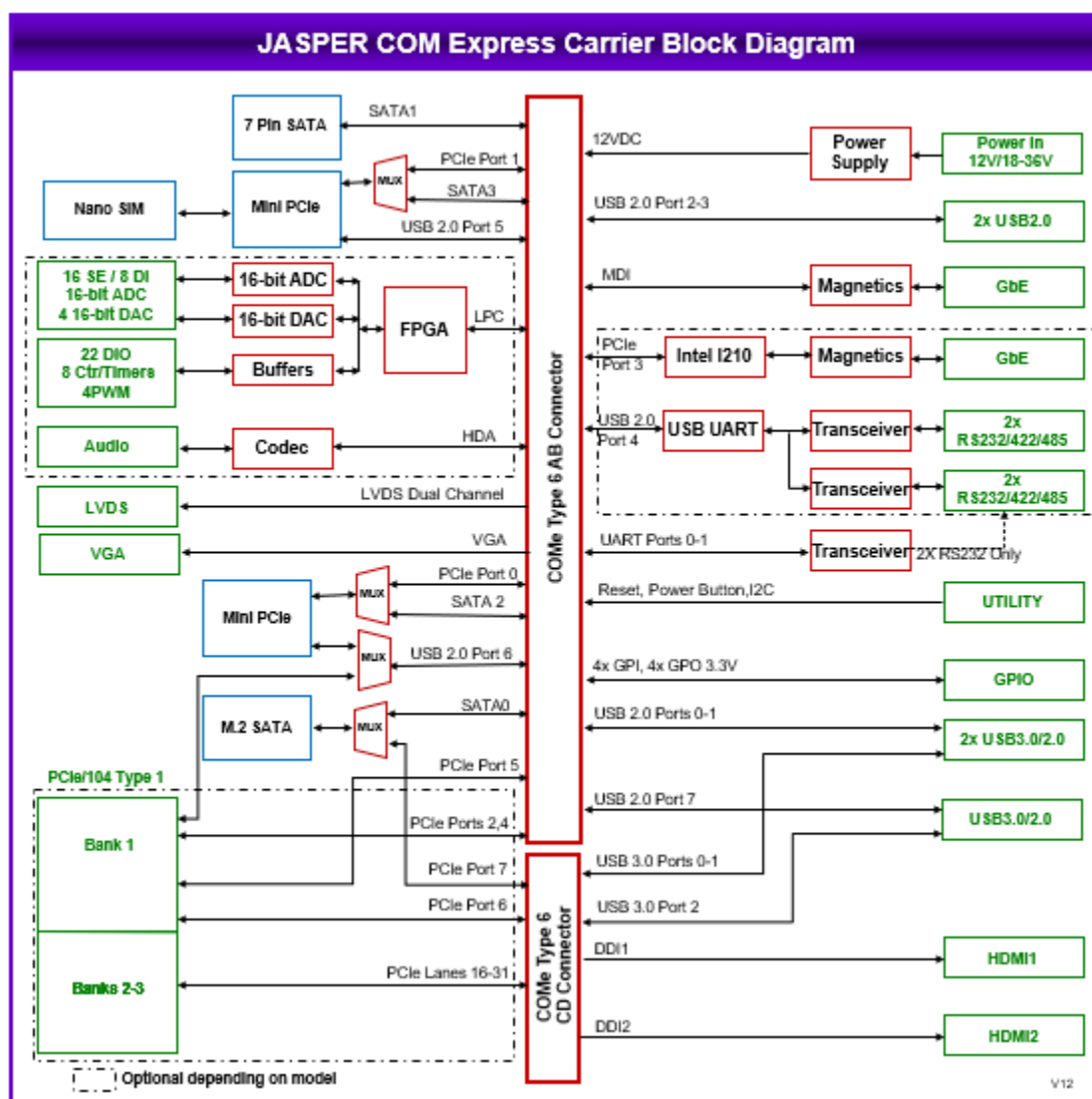


Figure 4-1: JASPER COM Express Carrier Board Block Diagram



## 5 MECHANICAL DRAWING

Below Figures Depict the Top and Bottom Mechanical view of the Jasper board.

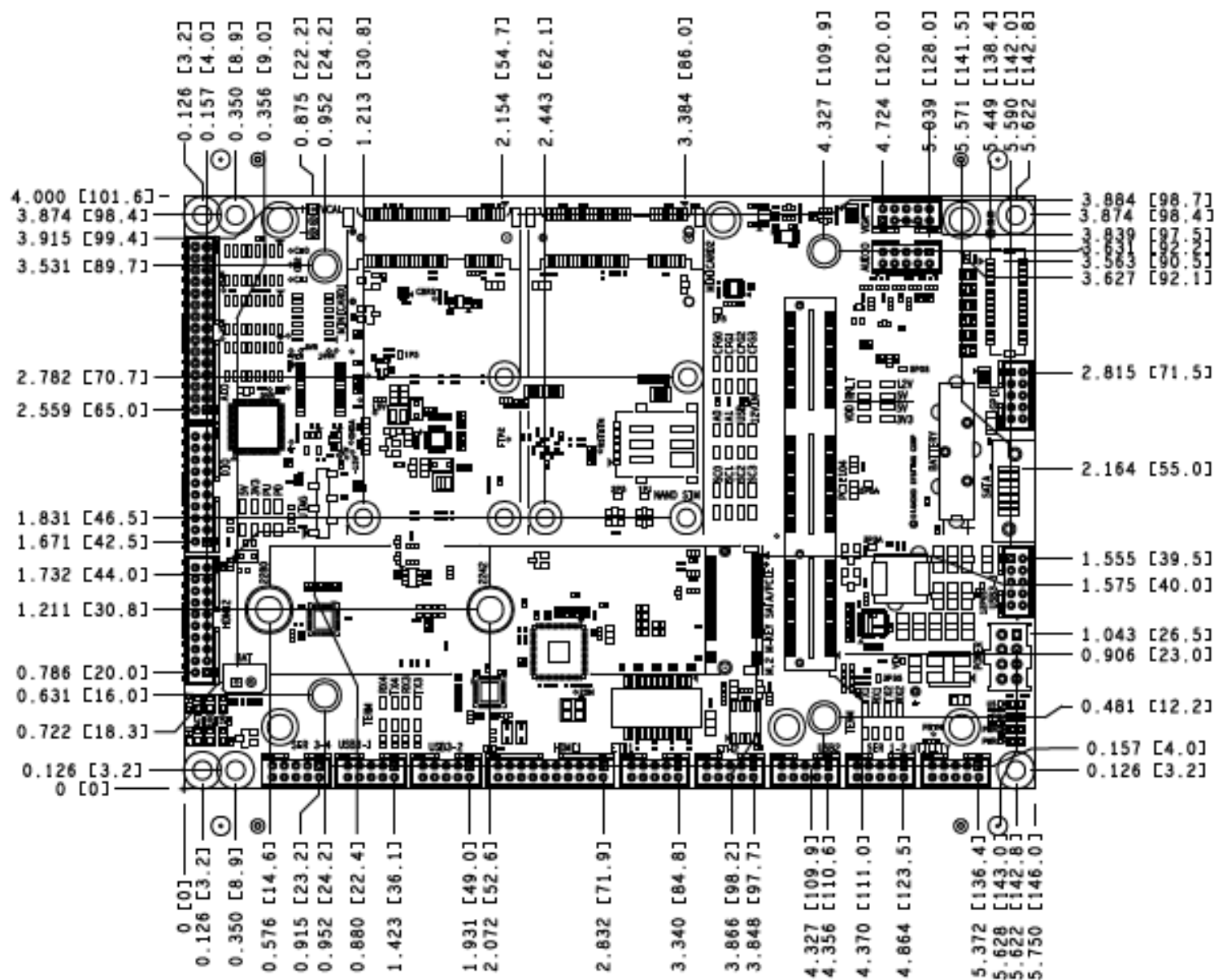


Figure 5-1: Mechanical Top View

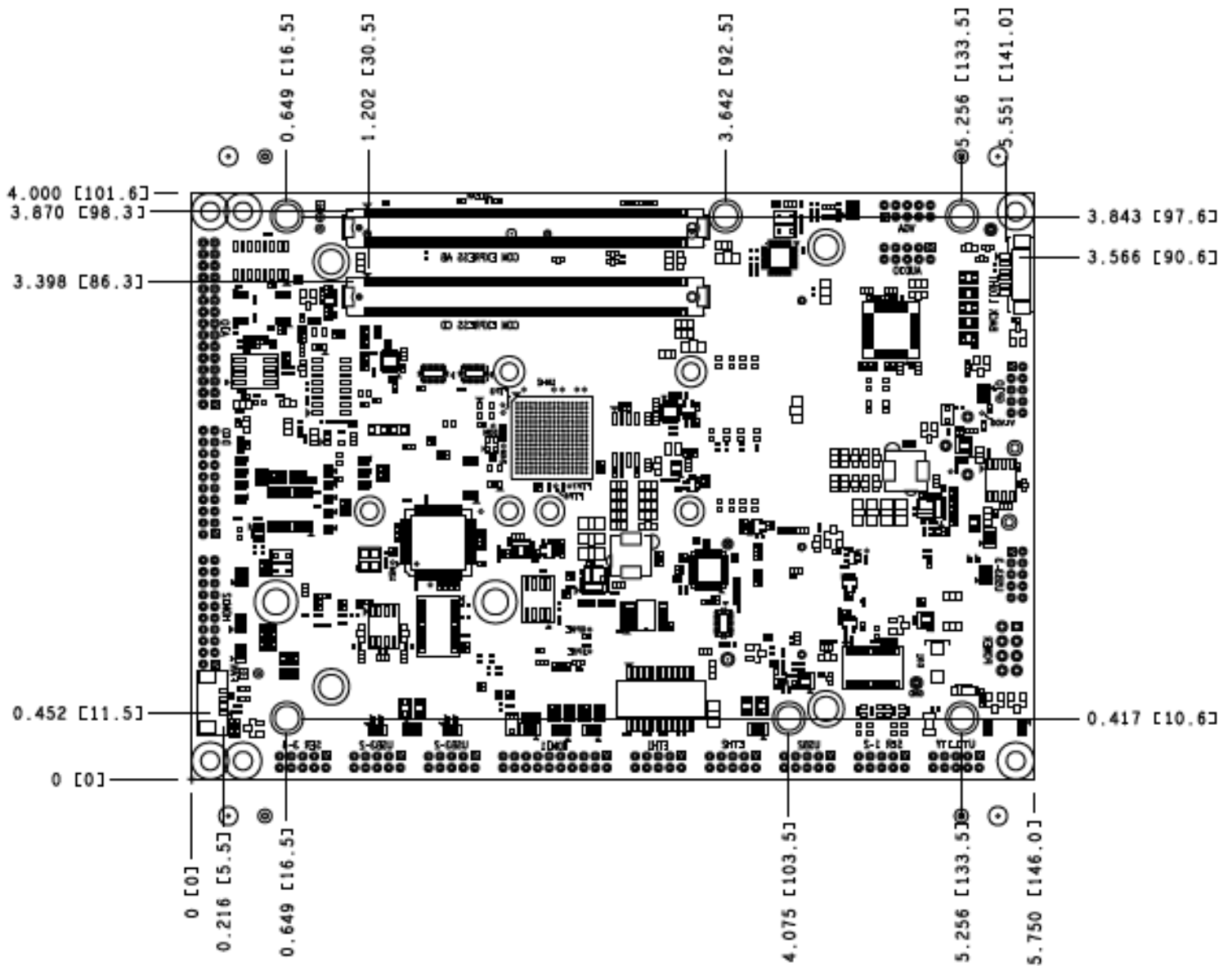


Figure 5-2: Mechanical Bottom View

## 6 CONNECTOR AND JUMPER LOCATION

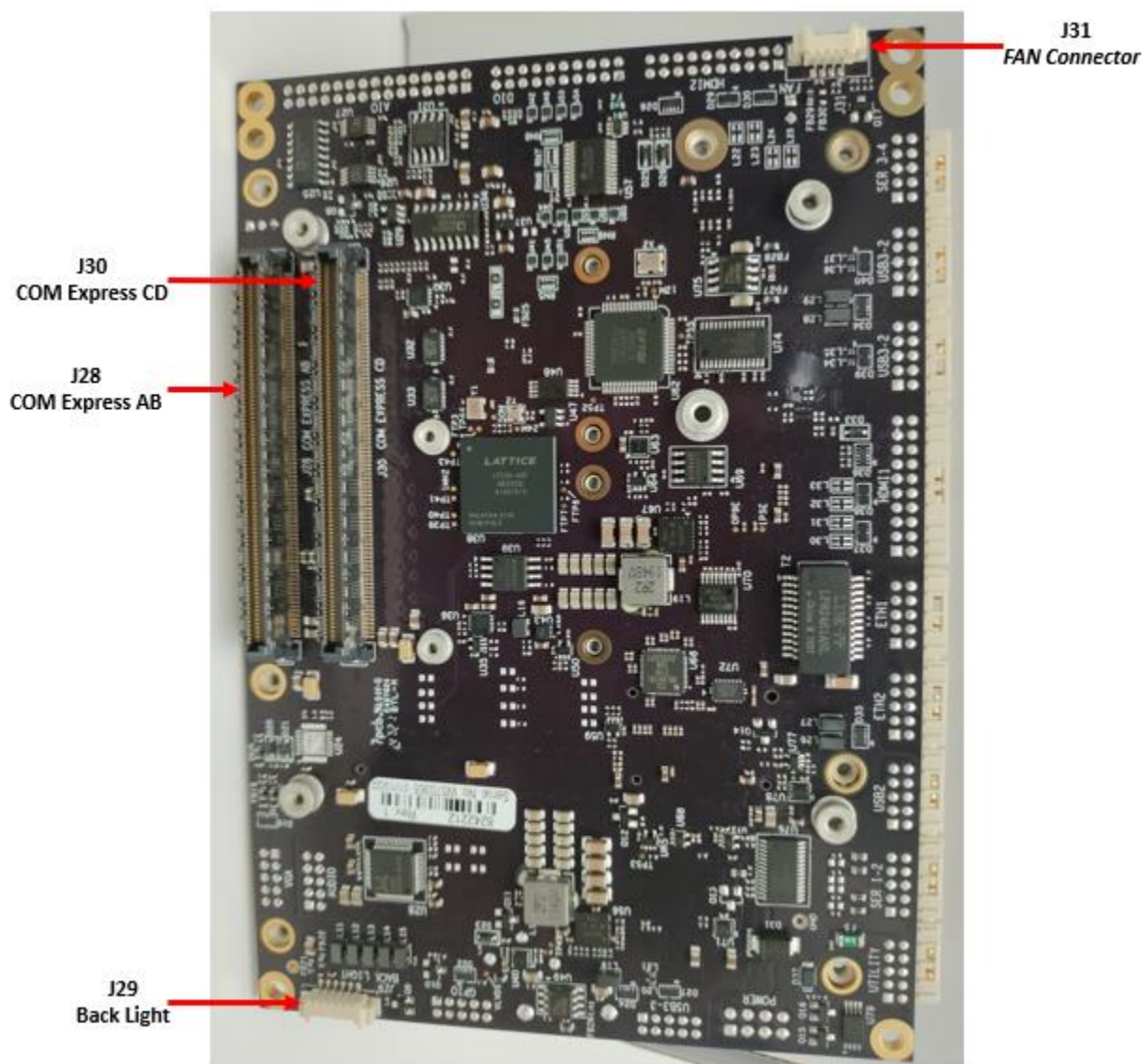
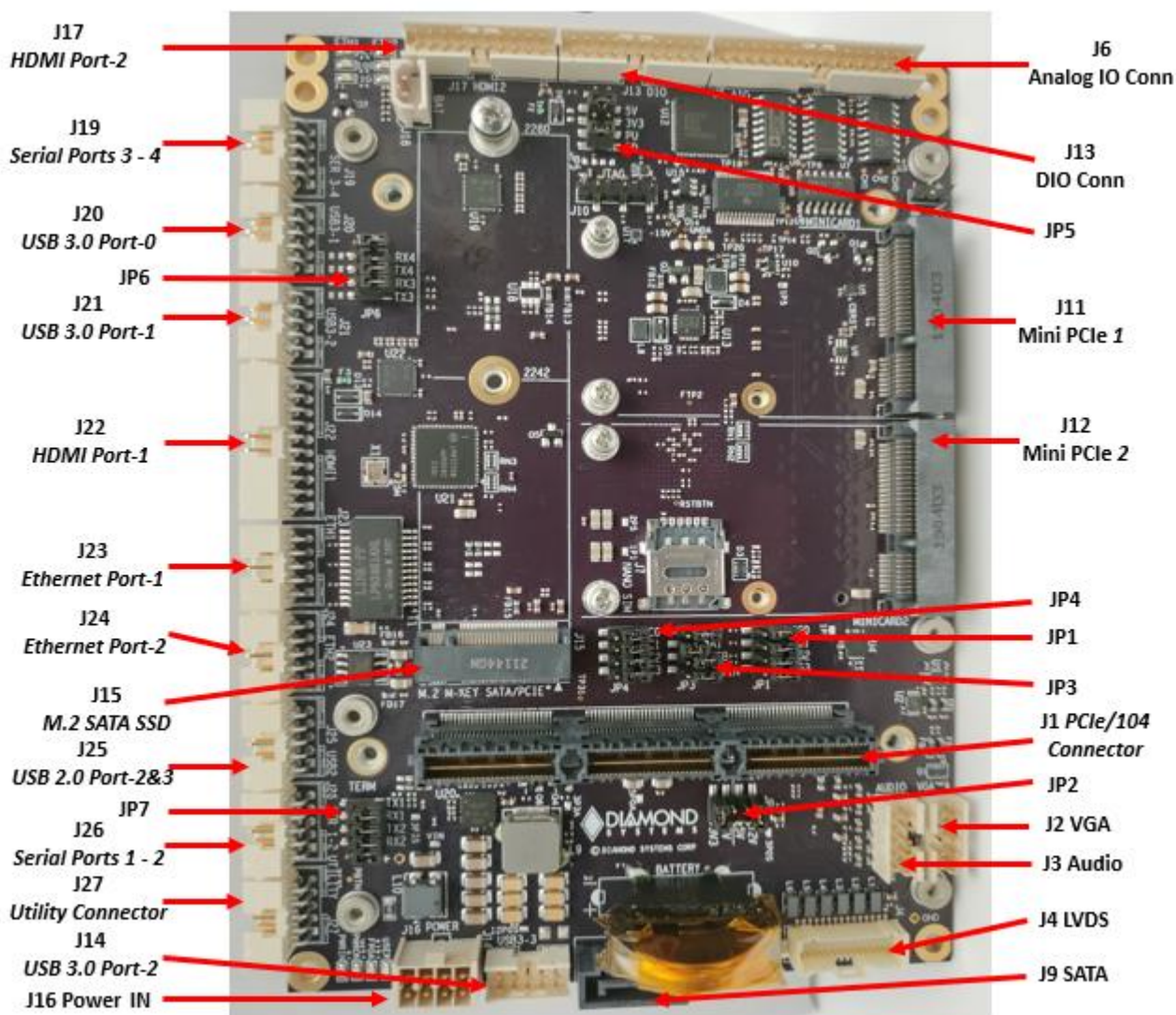


Figure 6-1: COM module installation side





**Figure 6-2: I/O expansion side**

## 6.1 Jumper Selection

The Jumper blocks on the Jasper board can be configured to enable/disable or alter the default signal routing settings on the circuit, using Jumper shunts.

The following table describes the Jumper Blocks on the baseboard.

Jumper	Description
<b>JP1</b>	FPGA UART/DIO selection
<b>JP2</b>	LVDS_BKLT and LVDS_VDD voltage level selection
<b>JP3</b>	FPGA address, USB TO MPCIE/PCIE/104, input voltage selection
<b>JP4</b>	Serial port mode selection
<b>JP5</b>	DIO Voltage and PU/PD selection
<b>JP6</b>	Serial Port 3 & 4 termination selection
<b>JP7</b>	Serial Port 1 & 2 termination selection

### Jumper Block JP1

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>CFG0</b>	FPGA Configuration IO0	TBD	<b>TBD*</b>
<b>CFG1</b>	FPGA Configuration IO1	TBD	<b>TBD*</b>
<b>CFG2</b>	FPGA Configuration IO2	TBD	<b>TBD*</b>
<b>CFG3</b>	FPGA Configuration IO3	TBD	<b>TBD*</b>

**\*Default Mode**

### Jumper Block JP2

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>12V</b>	LCD Backlight Voltage	<b>12V*</b>	-
<b>5V</b>	LCD Backlight Voltage	5V	-
<b>5V</b>	LCD VDD Voltage	5V	-
<b>3V3</b>	LCD VDD Voltage	<b>3.3V*</b>	-

**\*Default Mode**

### Jumper Block JP3

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>A0</b>	FPGA Address	Refer below table	
<b>A1</b>	FPGA Address	Refer below table	
<b>USB</b>	USB SEL	Minicard	<b>PCIe104*</b>
<b>12VIN</b>	Wide Input SEL	<b>12V Fixed</b>	<b>Wide Input*</b>

**\*Default Mode**

### FPGA Addresses

FPGA Address	<b>A0</b>	<b>A1</b>
FPGA Address - 0X200	IN	IN
FPGA Address - 0X240	IN	OUT
FPGA Address - 0X280	<b>OUT*</b>	<b>IN*</b>
FPGA Address - 0X300	OUT	OUT

**\*Default Mode**

### Jumper Block JP4

<i>Position</i>	<i>Port</i>	<i>RS232</i>	<i>RS485</i>	<i>RS422</i>	<i>Internal Loop</i>
SC0	1&2	<b>IN*</b>	OUT	OUT	IN
SC1	1&2	<b>OUT*</b>	IN	OUT	IN
SC2	3&4	<b>IN*</b>	OUT	OUT	IN
SC3	3&4	<b>OUT*</b>	IN	OUT	IN

**\*Default Mode**

Applicable only for 8242211 model. JP4 Jumper is software overridden by FGPA for 8242212 model.

### Jumper Block JP5

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>5V</b>	DIO Voltage Level	5V	-
<b>3V3</b>	DIO Voltage Level	<b>3.3V*</b>	-
<b>PU</b>	DIO Pull Up Enable	Enabled	Disabled
<b>PD</b>	DIO Pull Down Enable	<b>Enabled*</b>	Disabled
<b>*Default Mode</b>			

### Jumper Block JP6

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>TX3</b>	Serial Port3 TX Termination	Enabled	<b>Disabled*</b>
<b>RX3</b>	Serial Port3 RX Termination	Enabled	<b>Disabled*</b>
<b>TX4</b>	Serial Port4 TX Termination	Enabled	<b>Disabled*</b>
<b>RX4</b>	Serial Port4 RX Termination	Enabled	<b>Disabled*</b>
<b>*Default Mode</b>			

### Jumper Block JP7

<i>Position</i>	<i>Function</i>	<i>IN</i>	<i>OUT</i>
<b>TX1</b>	Serial Port1 TX Termination	Enabled	<b>Disabled*</b>
<b>RX1</b>	Serial Port1 RX Termination	Enabled	<b>Disabled*</b>
<b>TX2</b>	Serial Port2 TX Termination	Enabled	<b>Disabled*</b>
<b>RX2</b>	Serial Port2 RX Termination	Enabled	<b>Disabled*</b>
<b>*Default Mode</b>			

## 7 CONNECTOR PINOUT SPECIFICATIONS

### 7.1 Power In (J16)

A 2x4 latching pin header is used for power input.

GND	1	5	VIN
GND	2	6	VIN
GND	3	7	VIN
GND	4	8	VIN

**Connector Type:** 2.54mm pitch 2x4 box header TH vertical of Samtec# IPL1-104-01-L-D-K

Connector part number: Samtec IPL1-104-01-L-D-K  
 Mating Cable: DSC # 6980512



### 7.2 Battery (J18)

An external battery may be connected to support real-time clock and BIOS custom settings.

1	Battery V+
2	Ground

Connector part no.: Molex mini-SPOX 22-03-5025 two pin vertical TH shrouded pin header

Connector part number: Molex 22-03-5025  
 Mating Cable: DSC # 6980524



### 7.3 Fan Connector (J31)

External fan can be connected to conduct heat in a better way.

1	Fan PWM
2	Fan Tach
3	Fan PWR (5V/12V)
4	GND

Connector part no.: Molex 0532610471 4 pin Right Angle Surface Mount shrouded pin header  
 Recommended Fan part number: ASB0305HP-00CP4

Connector part number: Molex 0532610471





## 7.4 Ethernet (J23 & J24)

There are two identical on-board connectors for 10/100/1000 BASE T Ethernet.

Chassis Gnd	1	2	Key
DA+	3	4	DA-
DB+	5	6	DB-
DC+	7	8	DC-
DD+	9	10	DD-

Connector: FCI 98464-G61-10ULF latching 2x5 2mm pitch RA shrouded pin header

Connector part number: FCI 98464-G61-10ULF  
 Mating Cable: DSC # 6980604



## 7.5 Audio (J3)

This connector provides the audio signals.

LineOut-L	1	2	LineOut-R
GND_Audio	3	4	GND_Audio
LineIn-L	5	6	LineIn-R
GND_Audio	7	8	GND_Audio
NC	9	10	MIC_IN

Connector: FCI 98414-G06-10LF latching 2x5 2mm pitch vertical shrouded pin header

Connector part number: FCI 98414-G06-10LF  
 Mating Cable: DSC # 6980608



## 7.6 USB 2.0 Ports (J25)

The Carrier board supports 2 USB2.0 ports on a 2x5 connector. The pinout for the connector is as shown below:

<b>Key</b>	1	2	Shield
USB1 Pwr-	3	4	USB0 Pwr-
USB1 Data+	5	6	USB0 Data+
USB1 Data-	7	8	USB0 Data-
USB1 Pwr+	9	10	USB0 Pwr+

Connector: FCI 98464-G61-10ULF latching 2x5 2mm pitch RA shrouded pin header

Connector part number: FCI 98464-G61-10ULF  
 Mating Cable: DSC # 6980602



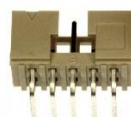
## 7.7 USB 3.0 Ports (J14, J20 & J21)

The Carrier board supports 3 USB3.0 ports on identical on-board 2x5 connectors. The connector supports backward compatibility to USB2.0. Pinout of the same is shown below:

USB_SSRX0-	1	2	Shield
USB_SSRX0+	3	4	USB Pwr-
USB Pwr-	5	6	USB2 D+
USB_SSTX0-	7	8	USB2 D-
USB_SSTX0+	9	10	USB Pwr+

Connector (J20 & J21): FCI 98464-G61-10ULF latching 2x5 2mm pitch RA shrouded pin header on the front edge of the board.

Connector part number: FCI 98464-G61-10ULF  
 Mating Cable: DSC # 6980603



(J14): FCI 98414-G06-10LF latching 2x5 2mm pitch vertical shrouded pin header on the right edge of board.

Connector part number: FCI 98414-G06-10LF  
 Mating Cable: DSC # 6980603



## 7.8 LVDS (J4)

The LCD panel power is jumper-selectable for 3.3V (default) or 5V.

VDD 5V/3.3V	1	2	VDD 5V/3.3V
VDD 5V/3.3V	3	4	VDD 5V/3.3V
CLK+ Odd	5	6	CLK+ Even
CLK- Odd	7	8	CLK-Even
Ground	9	10	Ground
D0+ Odd	11	12	D0+ Even
D0- Odd	13	14	D0- Even
D1+ Odd	15	16	D1+ Even
D1- Odd	17	18	D1- Even
D2+ Odd	19	20	D2+ Even
D2- Odd	21	22	D2- Even
D3+ Odd	23	24	D3+ Even
D3- Odd	25	26	D3- Even
Ground	27	28	Ground
DDC CLK	29	30	DDC DATA

Connector: Molex 5011903027 1mm pitch vertical shrouded pin header

Connector part number: Molex 5011903027  
 Mating Cable: Custom depending on the target display



## 7.9 LCD Backlight (J29)

The brightness control for the LCD backlight has a weak pull-down resistor to ensure maximum brightness when it is not connected externally. This signal may be controlled by a PWM pin on the COM module. A jumper selects the source of the brightness signal to this pin.

1	Power +5V/+12V, jumper selectable
2	Power (same as pin 1)
3	Ground
4	Ground
5	Enable (GPIO output), 0 = off, open circuit = on
6	Brightness, 0-5VDC variable; 0V = max, 5V = min

Connector Type: 1x6 1.25mm pitch SMD RA header of Chyao Shiunn# JS-1147H-06.

Connector part number: Chyao Shiunn# JS-1147H-06  
 Mating Cable: Custom depending on the target display



## 7.10 HDMI (J17 & J22)

The board supports 2 HDMI ports. HDMI signals come through a level translator IC from COM module over DDI lanes.

Data 2+	1	2	Ground
Data 2-	3	4	Data 1+
Ground	5	6	Data 1-
Data 0+	7	8	Ground
Data 0-	9	10	Clock+
Ground	11	12	Clock-
CEC	13	14	Reserved
DDC Clock	15	16	DDC Data
Ground	17	18	+5V
Hot Plug Detect	19	20	Chassis ground

Connector (J22): FCI 98464-G61-20ULF latching 2x10 2mm pitch RA shrouded pin header on the front edge of board.

Connector part number: FCI 98464-G61-20ULF  
 Mating Cable: DSC # 6980605



(J17): FCI 98414-F06-20ULF latching 2x10 2mm pitch vertical shrouded pin header on the left edge of board.

Connector part number: FCI 98414-F06-20ULF  
 Mating Cable: DSC # 6980605



## 7.11 VGA (J2)

This connector provides VGA signals.

VGA_RED	1	2	GND
VGA_GREEN	3	4	NC
VGA_BLUE	5	6	GND
VGA_HSYNC	7	8	VGA_DDC_DATA
VGA_VSYNC	9	10	VGA_DDC_CLK

Connector: FCI 98414-G06-10LF latching 2x5 2mm pitch vertical shrouded pin header

Mating cable: DSC no. 6981084 non latching cable

Connector part number: FCI 98414-G06-10LF  
 Mating Cable: DSC # 6981084 non latching cable



## 7.12 Serial ports (J19 & J26)

The COM express carrier board supports 4 serial ports available at 2 headers in full feature variant and only 2 RS232 ports at one of the connectors in low cost variant.

Each connector supports 2 serial ports. Pinouts are as follows depending on the mode of the transceiver (RS232/ RS422/ RS485).

### RS-232

TX1	1	2	RTS1
RX1	3	4	CTS1
GND	5	6	GND
TX2	7	8	RTS2
RX2	9	10	CTS2

### RS-422 (SP336)

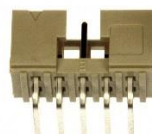
TX1+	1	2	TX1-
RX1+	3	4	RX1-
GND	5	6	GND
TX2+	7	8	TX2-
RX2+	9	10	RX2-

### RS-485 (SP336)

TX1/RX1+	1	2	TX1/RX1-
NC	3	4	NC
GND	5	6	GND
TX2/RX2+	7	8	TX2/RX2-
NC	9	10	NC

Connector: FCI 98464-G61-10ULF latching 2x5 2mm pitch right angle shrouded pin header

Connector part number: FCI 98464-G61-10ULF  
 Mating Cable: DSC # 6980601



## 7.13 M.2 Socket (J15)

M.2 2280/2242 supports SATA / PCIe using a high-speed mux. All TX/RX signals are with respect to the host. TX on the socket drives RX on the installed module, and RX on the socket is driven by TX on the installed module. The mounting standoffs of the module installation site is not connected to ground.

Gnd	1	2	+3.3V
Gnd	3	4	+3.3V
	5	6	MEM_ERS_2
	7	8	MEM_ERS_1
	9	10	
	11	12	+3.3V
	13	14	+3.3V
	15	16	+3.3V
	17	18	+3.3V
	19	20	
Gnd	21	22	
	23	24	
	25	26	
Gnd	27	28	
	29	30	
	31	32	
Gnd	33	34	
	35	36	
	37	38	
Gnd	39	40	
SATA_RX+/ PCIe RX-	41	42	
SATA_RX-/ PCIe RX+	43	44	
Gnd	45	46	
SATA_TX-/ PCIe TX-	47	48	
SATA_TX+/ PCIe TX+	49	50	PERST#
Gnd	51	52	PCIe CLKREQ#
PCIe REFCLK-	53	54	PCIe WAKE#
PCIe REFCLK+	55	56	
Gnd	57	58	
	<b>KEY</b>		
	67	68	
Gnd	69	70	+3.3V
Gnd	71	72	+3.3V
Gnd	73	74	+3.3V
Gnd	75		

Connector part number: 10128798-005RLF  
 Mating Cable: DSC # TBD



## 7.14 SATA (J9)

The SATA connector is an industry-standard vertical connector. This connector does not support the Pin 7 Vcc option for an installed SATA DOM.

1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

Connector part number: 0678005025  
 Mating Cable: DSC # TBD



## 7.15 Analog I/O (J16) and Digital I/O (J13)

The VIO pins on the analog and digital I/O connectors are tied together on the board and provide access to jumper-selectable 3.3V / 5V system voltage rail through a polyswitch resettable fuse. The fuse is rated for ~100mA maximum sustained current.

Ain 0	29	30	Ain 8
Ain 1	27	28	Ain 9
Ain 2	25	26	Ain 10
Ain 3	23	24	Ain 11
Ain 4	21	22	Ain 12
Ain 5	19	20	Ain 13
Ain 6	17	18	Ain 14
Ain 7	15	16	Ain 15
Analog Ground	13	14	Analog Ground
Aout 0	11	12	Aout 1
Aout 2	9	10	Aout 3
Analog Ground	7	8	DIO C0
DIO C1	5	6	DIO C2
DIO C3	3	4	DIO C4
VIO (fused)	1	2	Digital Ground

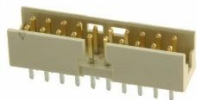
Connector Type: FCI 98414-G06-30LF latching 2x15 2mm pitch vertical shrouded pin header

Connector part number: FCI 98414-G06-30LF  
 Mating Cable: DSC # TBD



VIO (fused)	1	2	DIO A0
DIO A1	3	4	DIO A2
DIO A3	5	6	DIO A4
DIO A5	7	8	DIO A6
DIO A7	9	10	DIO B0
DIO B1	11	12	DIO B2
DIO B3	13	14	DIO B4
DIO B5	15	16	DIO B6
DIO B7	17	18	DIO C5
Ground	19	20	Ground

Connector Type: FCI 98414-F06-20ULF latching 2x10 2mm pitch vertical shrouded pin header

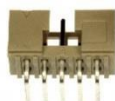
Connector part number: FCI 98414-F06-20ULF Mating Cable: DSC # TBD	
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## 7.16 Utility (J27)

The utility connector provides access to power button, reset signal, I2C and RTC power. It provides fused 3.3V power that can be used for powering customer auxiliary circuitry.

M_2_MEM_ERS_GPIO	1	2	I2C Clock
Ground	3	4	I2C Data
Ground	5	6	Power Button
V_3P3_RTC	7	8	Ground
3.3V Fused 0.5A	9	10	Reset

Connector Type: FCI 98464-G61-10ULF latching 2x5 2mm pitch right angle shrouded pin header

Connector part number: FCI 98464-G61-10ULF Mating Cable: DSC # 6980609	
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## 7.17 GPIO Connector (J5)

The GPIO connector provides access to 4 GPO and 4 GPI along with fused 3.3V power that can be used for powering customer auxiliary circuitry. GPI3 is muxed with the TPM IRQ and is available as general purpose input to the COM module by default.

GPI0	1	2	GPO0
GPI1	3	4	GPO1
GPI2	5	6	GPO2
GPI3	7	8	GPO3
3.3V Fused 0.5A	9	10	GND

Connector Type: FCI 98414-G06-10LF latching 2x5 2mm pitch vertical shrouded pin header



Connector part number: FCI 98414-G06-10LF  
 Mating Cable: DSC # 6980609



## 7.18 PCIe Mini Card (J11 & J12)

Minicard supports SATA / PCIe using a high-speed mux. All TX/RX signals are with respect to the host. TX on the socket drives RX on the installed module, and RX on the socket is driven by TX on the installed module. The mounting standoffs of the module installation site are not connected to ground.

PCIe WAKE#	1	2	+3.3V
	3	4	Gnd
	5	6	+1.5V
PCIe CLKREQ#	7	8	UIM PWR
Gnd	9	10	UIM CLK
PCIe CLK-	11	12	UIM DATA
PCIe 1 Clk+	13	14	UIM RESET
Gnd	15	16	UIM VPP
KEY			
	17	18	Gnd
	19	20	
Gnd	21	22	PCIe Reset-
PCIe RX-/SATA RX+	23	24	+3.3V
PCIe RX+/SATA RX-	25	26	Gnd
Gnd	27	28	+1.5V
Gnd	29	30	SMB Clk
PCIe TX-/SATA TX-	31	32	SMB Data
PCIe TX+/SATA TX+	33	34	Gnd
Gnd	35	36	USB D-
Gnd	37	38	USB D+
+3.3V	39	40	Gnd
+3.3V	41	42	
Ground	43	44	
	45	46	
	47	48	+1.5V
	49	50	Gnd
	51	52	+3.3V

Connector part number: 1759547-1  
 Mating Cable: DSC # TBD



## 7.19 PCIe104 Connector (J1)

This connector is implemented to facilitate I/O expansion modules to be plugged onto the carrier board. 4 PCIe x1 lanes are connected to the first bank PCIe104 connector. A x16 PCIe lane is connected from the COM CD connector to the second and third banks of PCIe104 connector. These signals are only functional when supported by the installed COM.

USB-OC#	1		2	PCIe Reset#
+3.3V	3		4	+3.3V
	5		6	USB_0+
	7		8	USB_0-
Ground	9		10	Ground
PCIe1 Tx+	11		12	PCIe0 Tx+
PCIe1 Tx-	13		14	PCIe0 Tx-
Ground	15		16	Ground
PCIe2 Tx+	17		18	PCIe3 Tx+
PCIe2 Tx-	19		20	PCIe3 Tx-
Ground	21		22	Ground
PCIe1 Rx+	23	+ 5 V	24	PCIe0 Rx+
PCIe1 Rx-	25		26	PCIe0 Rx-
Ground	27	T	28	Ground
PCIe2 Rx+	29	A	30	PCIe3 Rx+
PCIe2 Rx-	31	B	32	PCIe3 Rx-
Ground	33		34	Ground
PCIe1 Clk+	35		36	PCIe0 Clk+
PCIe1 Clk-	37		38	PCIe0 Clk-
+5VSB	39		40	+5VSB
PCIe2 Clk+	41		42	PCIe3 Clk+
PCIe2 Clk-	43		44	PCIe3 Clk-
Ground(Dir)	45		46	PWRGOOD
SMB Data	47		48	PEX_CLK+
SMB Clk	49		50	PEX_CLK-
SMB Alert#	51		52	PSON#

	53		54	
Ground	55		56	Ground
PEX16 Tx8+	57		58	PEX16 Tx0+
PEX16 Tx8-	59		60	PEX16 Tx0-
Ground	61		62	Ground
PEX16 Tx9+	63		64	PEX16 Tx1+
PEX16 Tx9-	65		66	PEX16 Tx1-
Ground	67		68	Ground
PEX16 Tx10+	69	+ 5 V	70	PEX16 Tx2+
PEX16 Tx10-	71		72	PEX16 Tx2-
Ground	73		74	Ground
PEX16 Tx11+	75	T	76	PEX16 Tx3+
PEX16 Tx11-	77	A	78	PEX16 Tx3-
Ground	79	B	80	Ground
PEX16 Tx12+	81		82	PEX16 Tx4+
PEX16 Tx12-	83		84	PEX16 Tx4-
Ground	85		86	Ground
PEX16 Tx13+	87		88	PEX16 Tx5+
PEX16 Tx13-	89		90	PEX16 Tx5-
Ground	91		92	Ground
PEX16 Tx14+	93		94	PEX16 Tx6+
PEX16 Tx14-	95		96	PEX16 Tx6-

Ground	97		98	Ground
PEx16 Tx15+	99		100	PEx16 Tx7+
PEx16 Tx15-	101		102	PEx16 Tx7-
Ground	103		104	Ground
	105		106	
Ground	107		108	Ground
PEx16 Rx8+	109		110	PEx16 Rx0+
PEx16 Rx8-	111		112	PEx16 Rx0-
Ground	113		114	Ground
PEx16 Rx9+	115		116	PEx16 Rx1+
PEx16 Rx9-	117		118	PEx16 Rx1-
Ground	119		120	Ground
PEx16 Rx10+	121		122	PEx16 Rx2+
PEx16 Rx10-	123		124	PEx16 Rx2-
Ground	125	+ 5 V	126	Ground
PEx16 Rx11+	127		128	PEx16 Rx3+
PEx16 Rx11-	129		130	PEx16 Rx3-
Ground	131	T A B	132	Ground
PEx16 Rx12+	133		134	PEx16 Rx4+
PEx16 Rx12-	135		136	PEx16 Rx4-
Ground	137		138	Ground
PEx16 Rx13+	139		140	PEx16 Rx5+
PEx16 Rx13-	141		142	PEx16 Rx5-
Ground	143		144	Ground
PEx16 Rx14+	145		146	PEx16 Rx6+
PEx16 Rx14-	147		148	PEx16 Rx6-
Ground	149		150	Ground
PEx16 Rx15+	151		152	PEx16 Rx7+
PEx16 Rx15-	153		154	PEx16 Rx7-
Ground	155		156	Ground

Connector part number: ASP-142781-03



## 7.20 COM Express type 6 Compact / Basic connector Pinout (J28 & J30)

This is a 2-connector set. The first connector consists of rows A and B, while the second connector consists of rows C and D.

GND	A1	B1	GND
GBE0_MDI3-	A2	B2	GBE0_ACT#
GBE0_MDI3+	A3	B3	LPC_FRAME#
GBE0_LINK100#	A4	B4	LPC_AD0
GBE0_LINK1000#	A5	B5	LPC_AD1
GBE0_MDI2-	A6	B6	LPC_AD2

GBE0_MDI2+	<b>A7</b>	<b>B7</b>	LPC_AD3
GBE0_LINK#	<b>A8</b>	<b>B8</b>	
GBE0_MDI1-	<b>A9</b>	<b>B9</b>	
GBE0_MDI1+	<b>A10</b>	<b>B10</b>	LPC_CLK
GND	<b>A11</b>	<b>B11</b>	GND
GBE0_MDI0-	<b>A12</b>	<b>B12</b>	PWRBTN#
GBE0_MDI0+	<b>A13</b>	<b>B13</b>	SMB_CK
GBE0_CTREF	<b>A14</b>	<b>B14</b>	SMB_DAT
SUS_S3#	<b>A15</b>	<b>B15</b>	SMB_ALRERT#
SATA0_TX+	<b>A16</b>	<b>B16</b>	SATA1_TX+
SATA0_TX-	<b>A17</b>	<b>B17</b>	SATA1_TX-
SUS_S4#	<b>A18</b>	<b>B18</b>	
SATA0_RX+	<b>A19</b>	<b>B19</b>	SATA1_RX+
SATA0_RX-	<b>A20</b>	<b>B20</b>	SATA1_RX-
GND	<b>A21</b>	<b>B21</b>	GND
SATA2_TX+	<b>A22</b>	<b>B22</b>	SATA3_TX+
SATA2_TX-	<b>A23</b>	<b>B23</b>	SATA3_TX-
	<b>A24</b>	<b>B24</b>	PWR_OK
SATA2_RX+	<b>A25</b>	<b>B25</b>	SATA3_RX+
SATA2_RX-	<b>A26</b>	<b>B26</b>	SATA3_RX-
	<b>A27</b>	<b>B27</b>	WDT
	<b>A28</b>	<b>B28</b>	
AC_SYNC	<b>A29</b>	<b>B29</b>	
AC_RST#	<b>A30</b>	<b>B30</b>	AC/HDA_SDINO
GND	<b>A31</b>	<b>B31</b>	GND
AC_BITCLK	<b>A32</b>	<b>B32</b>	SPKR
AC_SDOOUT	<b>A33</b>	<b>B33</b>	I2C_CK
BIOS_DIS0#	<b>A34</b>	<b>B34</b>	I2C_DAT
	<b>A35</b>	<b>B35</b>	
USB6-	<b>A36</b>	<b>B36</b>	USB7-
USB6+	<b>A37</b>	<b>B37</b>	USB7+
USB_6_7_OC#	<b>A38</b>	<b>B38</b>	
USB4-	<b>A39</b>	<b>B39</b>	USB5-
USB4+	<b>A40</b>	<b>B40</b>	USB5+
GND	<b>A41</b>	<b>B41</b>	GND
USB2-	<b>A42</b>	<b>B42</b>	USB3-
USB2+	<b>A43</b>	<b>B43</b>	USB3+
USB_2_3_OC#	<b>A44</b>	<b>B44</b>	USB_0_1_OC#
USB0-	<b>A45</b>	<b>B45</b>	USB1-
USB0+	<b>A46</b>	<b>B46</b>	USB1+
VCC_RTC	<b>A47</b>	<b>B47</b>	
	<b>A48</b>	<b>B48</b>	
	<b>A49</b>	<b>B49</b>	SYS_RESET#
LPC_SERIRQ	<b>A50</b>	<b>B50</b>	CB_RESET#
GND	<b>A51</b>	<b>B51</b>	GND
PCIE_TX5+	<b>A52</b>	<b>B52</b>	PCIE_RX5+
PCIE_TX5-	<b>A53</b>	<b>B53</b>	PCIE_RX5-
GPI0	<b>A54</b>	<b>B54</b>	SD_CMD
PCIE_TX4+	<b>A55</b>	<b>B55</b>	PCIE_RX4+
PCIE_TX4-	<b>A56</b>	<b>B56</b>	PCIE_RX4-
GND	<b>A57</b>	<b>B57</b>	SD_WP
PCIE_TX3+	<b>A58</b>	<b>B58</b>	PCIE_RX3+
PCIE_TX3-	<b>A59</b>	<b>B59</b>	PCIE_RX3-
GND	<b>A60</b>	<b>B60</b>	GND
PCIE_TX2+	<b>A61</b>	<b>B61</b>	PCIE_RX2+
PCIE_TX2-	<b>A62</b>	<b>B62</b>	PCIE_RX2-
GPI1	<b>A63</b>	<b>B63</b>	SD_CD#
PCIE_TX1+	<b>A64</b>	<b>B64</b>	PCIE_RX1+
PCIE_TX1-	<b>A65</b>	<b>B65</b>	PCIE_RX1-
GND	<b>A66</b>	<b>B66</b>	WAKE0#

GPI2	A67	B67	
PCIE_TX0+	A68	B68	PCIE_RX0+
PCIE_TX0-	A69	B69	PCIE_RX0-
GND	A70	B70	GND
LVDS_A0+	A71	B71	LVDS_B0+
LVDS_A0-	A72	B72	LVDS_B0-
LVDS_A1+	A73	B73	LVDS_B1+
LVDS_A1-	A74	B74	LVDS_B1-
LVDS_A2+	A75	B75	LVDS_B2+
LVDS_A2-	A76	B76	LVDS_B2-
LVDS_VDD_EN	A77	B77	LVDS_B3+
LVDS_A3+	A78	B78	LVDS_B3-
LVDS_A3-	A79	B79	LVDS_BKLT_EN
GND	A80	B80	GND
LVDS_A_CLK+	A81	B81	LVDS_B_CLK+
LVDS_A_CLK-	A82	B82	LVDS_B_CLK-
LVDS_I2C_CK	A83	B83	LVDS_BKLT_CTRL
LVDS_I2C_DAT	A84	B84	VCC_5V_SBY
GPI3	A85	B85	VCC_5V_SBY
	A86	B86	VCC_5V_SBY
	A87	B87	VCC_5V_SBY
PCIE0_CK_REF+	A88	B88	BIOS_DIS1#
PCIE0_CK_REF-	A89	B89	VGA_RED
GND	A90	B90	GND
SPI_POWER	A91	B91	VGA_GRN
SPI_MSIO	A92	B92	VGA_BLU
SD_CLK	A93	B93	VGA_HSYNC
SPI_CKL	A94	B94	VGA_VSYNC
SPI_MOSI	A95	B95	VGA_I2C_CK
TPM_PP (N/C)	A96	B96	VGA_I2C_DAT
	A97	B97	SPI_CS#
SER0_TX	A98	B98	
SER0_RX	A99	B99	
GND	A100	B100	GND
SER1_TX	A101	B101	FAN_PWMOUT
SER1_RX	A102	B102	FAN_TACHIN
	A103	B103	
VCC_12V	A104	B104	VCC_12V
VCC_12V	A105	B105	VCC_12V
VCC_12V	A106	B106	VCC_12V
VCC_12V	A107	B107	VCC_12V
VCC_12V	A108	B108	VCC_12V
VCC_12V	A109	B109	VCC_12V
GND	A110	B110	GND

GND	C1	D1	GND
GND	C2	D2	GND
USB_SSRX0-	C3	D3	USB_SSTX0-
USB_SSRX0+	C4	D4	USB_SSTX0+
GND	C5	D5	GND
USB_SSRX1-	C6	D6	USB_SSTX1-
USB_SSRX1+	C7	D7	USB_SSTX1+
GND	C8	D8	GND
USB_SSRX2-	C9	D9	USB_SSTX2-
USB_SSRX2+	C10	D10	USB_SSTX2+
GND	C11	D11	GND
	C12	D12	
	C13	D13	

GND	C14	D14	GND
	C15	D15	DDI1_CTRLCLK_AUX+
	C16	D16	DDI1_CTRLDATA_AUX-
	C17	D17	
	C18	D18	
PCIE_RX6+	C19	D19	PCIE_TX6+
PCIE_RX6-	C20	D20	PCIE_TX6-
GND	C21	D21	GND
PCIE_RX7+	C22	D22	PCIE_TX7+
PCIE_RX7-	C23	D23	PCIE_TX7-
DDI1_HPD	C24	D24	
	C25	D25	
	C26	D26	DDI1_PAIR0+
	C27	D27	DDI1_PAIR0-
	C28	D28	
	C29	D29	DDI1_PAIR1+
	C30	D30	DDI1_PAIR1-
GND	C31	D31	GND
DDI2_CTRLCLK_AUX+	C32	D32	DDI1_PAIR2+
DDI2_CTRLDATA_AUX-	C33	D33	DDI1_PAIR2-
DDI2_DDC_AUX_SEL	C34	D34	DDI1_DDC_AUX_SEL
	C35	D35	
	C36	D36	DDI1_PAIR3+
	C37	D37	DDI1_PAIR3-
	C38	D38	
	C39	D39	DDI2_PAIR0+
	C40	D40	DDI2_PAIR0-
GND	C41	D41	GND
	C42	D42	DDI2_PAIR1+
	C43	D43	DDI2_PAIR1-
	C44	D44	DDI2_HPD
	C45	D45	
	C46	D46	DDI2_PAIR2+
	C47	D47	DDI2_PAIR2-
	C48	D48	
	C49	D49	DDI2_PAIR3+
	C50	D50	DDI2_PAIR3-
GND	C51	D51	GND
PEG_RX0+	C52	D52	PEG_TX0+
PEG_RX0-	C53	D53	PEG_TX0-
	C54	D54	
PEG_RX1+	C55	D55	PEG_TX1+
PEG_RX1-	C56	D56	PEG_TX1-
	C57	D57	TYPE2#
PEG_RX2+	C58	D58	PEG_TX2+
PEG_RX2-	C59	D59	PEG_TX2-
GND	C60	D60	GND
PEG_RX3+	C61	D61	PEG_TX3+
PEG_RX3-	C62	D62	PEG_TX3-
	C63	D63	
	C64	D64	
PEG_RX4+	C65	D65	PEG_TX4+
PEG_RX4-	C66	D66	PEG_TX4-
	C67	D67	GND
PEG_RX5+	C68	D68	PEG_TX5+
PEG_RX5-	C69	D69	PEG_TX5-
GND	C70	D70	GND
PEG_RX6+	C71	D71	PEG_TX6+
PEG_RX6-	C72	D72	PEG_TX6-
GND	C73	D73	GND

PEG_RX7+	<b>C74</b>	<b>D74</b>	PEG_TX7+
PEG_RX7-	<b>C75</b>	<b>D75</b>	PEG_TX7-
GND	<b>C76</b>	<b>D76</b>	GND
	<b>C77</b>	<b>D77</b>	
PEG_RX8+	<b>C78</b>	<b>D78</b>	PEG_TX8+
PEG_RX8-	<b>C79</b>	<b>D79</b>	PEG_TX8-
GND	<b>C80</b>	<b>D80</b>	GND
PEG_RX9+	<b>C81</b>	<b>D81</b>	PEG_TX9+
PEG_RX9-	<b>C82</b>	<b>D82</b>	PEG_TX9-
	<b>C83</b>	<b>D83</b>	
GND	<b>C84</b>	<b>D84</b>	GND
PEG_RX10+	<b>C85</b>	<b>D85</b>	PEG_TX10+
PEG_RX10-	<b>C86</b>	<b>D86</b>	PEG_TX10-
GND	<b>C87</b>	<b>D87</b>	GND
PEG_RX11+	<b>C88</b>	<b>D88</b>	PEG_TX11+
PEG_RX11-	<b>C89</b>	<b>D89</b>	PEG_TX11-
GND	<b>C90</b>	<b>D90</b>	GND
PEG_RX12+	<b>C91</b>	<b>D91</b>	PEG_TX12+
PEG_RX12-	<b>C92</b>	<b>D92</b>	PEG_TX12-
GND	<b>C93</b>	<b>D93</b>	GND
PEG_RX13+	<b>C94</b>	<b>D94</b>	PEG_TX13+
PEG_RX13-	<b>C95</b>	<b>D95</b>	PEG_TX13-
GND	<b>C96</b>	<b>D96</b>	GND
	<b>C97</b>	<b>D97</b>	
PEG_RX14+	<b>C98</b>	<b>D98</b>	PEG_TX14+
PEG_RX14-	<b>C99</b>	<b>D99</b>	PEG_TX14-
GND	<b>C100</b>	<b>D100</b>	GND
PEG_RX15+	<b>C101</b>	<b>D101</b>	PEG_TX15+
PEG_RX15-	<b>C102</b>	<b>D102</b>	PEG_TX15-
GND	<b>C103</b>	<b>D103</b>	GND
VCC_12V	<b>C104</b>	<b>D104</b>	VCC_12V
VCC_12V	<b>C105</b>	<b>D105</b>	VCC_12V
VCC_12V	<b>C106</b>	<b>D106</b>	VCC_12V
VCC_12V	<b>C107</b>	<b>D107</b>	VCC_12V
VCC_12V	<b>C108</b>	<b>D108</b>	VCC_12V
VCC_12V	<b>C109</b>	<b>D109</b>	VCC_12V
GND	<b>C110</b>	<b>D110</b>	GND

Connector part number: QT002206-4131-3H





## 8 I/O CONNECTOR LIST

The following table provides a summary of the I/O connectors on the board.

Function	Manufacturer	Part no.	Description	DSC Mating Cable
Power in	Samtec	IPL1-104-01-L-D-K	2x4 latching box header TH vertical .1" pitch, long PCB pins	6980512
USB 2.0	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980602
USB 3.0 qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980603
USB 3.0 qty 1	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980603
Ethernet qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980604
Serial Ports qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980601
LVDS	Molex	5011903027	2x15 1mm pitch vertical SMT shrouded header	Custom
HDMI qty 1	Amphenol	98464-G61-20ULF	2x10 2mm pitch latching RA TH header	6980605
HDMI qty 1	Amphenol	98414-F06-20ULF	2x10 2mm pitch latching vertical TH header	6980605
Backlight	Molex	053261-0671	1x6 1.25mm pitch SMD RA header	Custom
External battery	Molex	22-03-5025	2 position 2.5mm pitch vertical TH header	6980524
Analog I/O	Amphenol	98414-G06-30LF	30 Pos 1.5mm Pitch SMT vertical Latching	TBD
Digital I/O	Amphenol	98414-F06-20ULF	20 Pos 1.25mm Pitch SMT vertical Latching	TBD
Audio	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980608
VGA	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6981084
Utility	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980609
GPIO	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980609
FAN	Molex	0533980471	1x4 1.25mm pitch SMD vertical header	
PCIe104	Samtec	ASP-142781-03	156 Pos Top Mount	NA
M.2	Amphenol	10128798-005RLF	Connector Female 67position 0.020 pitch	NA
SATA	Molex	0678005025	Connector header 7 position vertical TH	Standard Cable
PCIe Minicard	TE	1759547-1	52-pin Minicard, full size, with PCB mount threaded spacers	NA
COM Express Compact	Foxconn	QT002206-4131-3H	220 Position Connector Plug, SMT, Outer Shroud Contacts Surface Mount Gold	NA

## 9 SPECIFICATIONS

The Jasper board specifications are summarized in the following table.

<b>Feature</b>	<b>Brief Description</b>
Module	Jasper COM Express Type 6 Carrier Board
Display	2x HDMI 1x VGA (Based on the COMe module) 1x Dual Channel 24-bit LVDS port with 3.3V / 5V power option
LCD Backlight	LCD backlight power and control signals with 5V / 12V power option
USB Ports	2x USB 2.0, 3x USB 3.0/USB2.0
Serial Ports	4 x ports Software configurable RS-232/422/485 2x ports fixed RS-232
Ethernet	ETH-1 10/100/1000Mbps from COM module ETH-2 10/100/1000Mbps via I210 Ethernet controller
Mass Storage	2x mPCIe socket 1 M.2 2242 / 2280 SATA/x1 PCIe 1 Standard 7pin SATA connector
Audio	HDA to Analog Audio converter
RTC	3V power input for RTC functionality
Analog/Digital IO	16 Single ended/ 8 Differential ended Ain 4 Aout 22 Programmable direction digital I/O, 3.3V/5V logic compatible
PCIe104	4 PCIe x1 ports, 1x PCIe x16, 1 USB 2.0
<b><i>Electrical, Mechanical and Environmental Properties</i></b>	
System Input Voltage	18V-36VDC wide input or 12VDC fixed supply
Power Consumption	TBU
Dimensions	4.000" x 5.750"
Weight	TBU
Operating Temperature	-40°C to +85°C (depending on installed COM)
RoHS	Compliant

## 10 LIMITED WARRANTY

Diamond Systems Corporation warrants that its products will be free from defects and errors in material and workmanship and perform in full accordance with the technical specifications stated in the description of the product for a duration of 2-Year Period from the Date of Shipment.

Unless otherwise stated, Diamond Systems Corporation Limited Warranty Policy covers the following criterion.

- It is extended to the original Purchaser/Consumer.
- Under Terms and Conditions of the Warranty, Diamond Systems Corporation, at its sole discretion, will repair or replace any defective parts or components of its product.
- The product must be returned to Diamond Systems Corporation in the-approved packaging, pre-authorized with a Diamond Systems Corporation-assigned Return Material Authorization (RMA) Number which is referenced on the shipping document.
- The Customer will prepay the shipment cost of the product to the Diamond Systems Corporation designated site.
- Diamond Systems Corporation will prepay the return shipping cost of the repaired or replaced the RMA product.

Diamond Systems Corporation Limited Warranty Policy does not cover product defects or damages incurred due to:

- Attempts by Customer to repair or resolve any product issues without the prior consent of Diamond Systems Corporation.
- Mishandling, misuse, neglect, normal wear, and tear, or accident.
- DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH DIAMOND SYSTEMS CORPORATION PRODUCTS, AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT.

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**NOTE:** THE LIMITED WARRANTY POLICY DOES NOT WARRANT TO REPAIR ANY OR EVERY DIAMOND SYSTEMS CORPORATION PRODUCT.

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